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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/616,356	07/10/2003	Yasutaka Konno	520.42928X00	2366

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EXAMINER

THOMAS, COURTNEY D

ART UNIT PAPER NUMBER

2882

DATE MAILED: 07/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/616,356

Applicant(s)

KONNO ET AL.

Examiner

Courtney Thomas

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 December 1899.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-14 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-3 and 5-14 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 23 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 06/23/05
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION***Information Disclosure Statement***

1. The information disclosure statement (IDS) submitted on 06.23.05 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

2. The drawings were received on 06.23.05. These drawings are acceptable.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-3 and 5-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Yoshida (U.S. Patent 6,393,092) and Muehllehner (U.S. Patent 6,462,341).

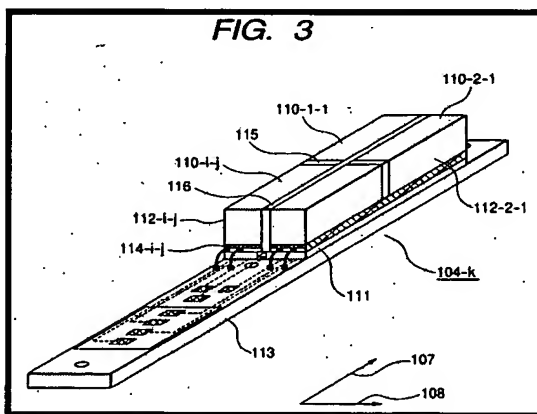
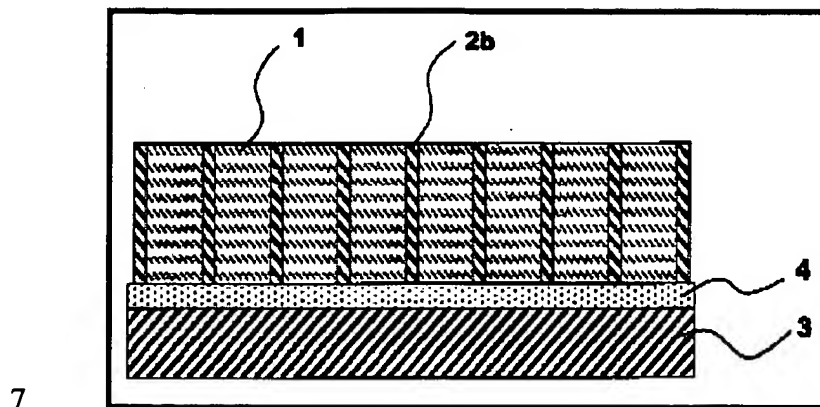


Figure 3 – X-ray Detector - AAPA - U.S. Patent Application 10/616,356; pp. 3-4 and 9

6. As per claims 1-3 and 9-11, Applicant's Admitted Prior Art (hereafter AAPA) discloses an X-ray detector (104) comprising: an X-ray sensitive module having a plurality of X-ray detecting elements (110) having a scintillator (112) converting an X-ray into light via optical reflecting means (115, 116) in a first and second direction; a photo-electric module (111) containing photo-electric means (114) located in a two dimensional manner corresponding to the X-ray detecting elements; a distribution module (113) and module wiring means (not numbered, see Fig. 3 above) electrically connecting electrode pads (not numbered) of the photo-electric modules (111). Examiner notes that the discussion of the Prior art is not explicit in disclosing the presence of detection elements such as a) data lines - commonly understood as column address lines and b) (row) address lines - commonly understood as "scan lines" or simply "address lines" in the detection art. Examiner concludes that it would be understood by one having ordinary skill in the art that the aforementioned Prior Art X-ray detector possessed corresponding address and data lines for reading out electrical signals detected by the X-ray detecting elements (110). Examiner considers "electrode pads" as referring to electrical contact points within the device - which are not numbered, but illustrated in Fig. 3 above. Furthermore, Examiner treats similarly numbered elements (i.e. contrast Fig 1 (110) and Fig. 3 (110)) as functionally equivalent elements (see also Specification p. 39, lines 23-28). AAPA does not explicitly disclose a transparent means optically connected to a light output surface of a scintillator and a corresponding photoelectric means; wherein in at least one of the transparent means an area of a light output surface optically connected to the photoelectric means is smaller than an area of a light input surface upon which light from the scintillator is incident.



8.

Further, as the material for the adhesive layer 4 which 55 couples optically and mechanically the scintillators 1 and the isolation walls 2a with the two dimensionally arranged silicon photo diode array 3, an epoxy resin which shows a high transparency, a stability with regard to X-ray and a refractive index of $n \geq 1.5$, can be used, for example. Such a 60

Figure 6 & column 9, lines 55-60 – U.S. Patent 6,393,092 to Yoshida

9. Yoshida discloses the utilization of a transparent means (4) for optical coupling of a scintillator output (1) and a corresponding photoelectric means (3). Yoshida teaches that the transparent means serves as an adhesive layer, providing mechanical stability and connectivity between the aforementioned elements, while displaying high transparency and stability in the presence of X-ray radiation. Yoshida suggests the transparency of the transparent means would not adversely affect detector resolution (see above, Fig. 6 and column 9, lines 55-60).

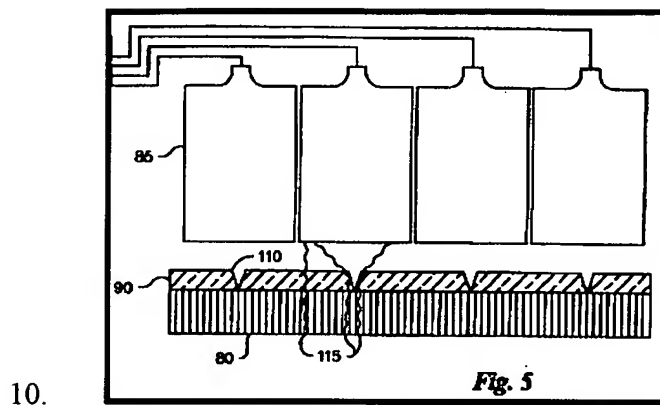


Figure 5 – U.S. Patent 6,462,341 to Muehllehner

11. Muehllehner discloses a transparent means (90) wherein in at least one of the transparent means an area of a light output surface optically connected to photoelectric means (85) is smaller than an area of a light input surface upon which light from the scintillator (80) is incident. Examiner notes that the transparent means (90) comprises linear and non-linear surfaces and further having a shape in which an angle θ created between an input surface of the transparent means and an adjacent surface of the transparent means satisfies the relationship: $45 \text{ degrees} < \theta < 90 \text{ degrees}$ (see Fig.5 above). Muehllehner teaches that such construction enables the channeling of photons whereby the number of photoelectric means (85) needed for event detection is reduced (column 5, lines 38-42).

12. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the AAPA to incorporate a transparent means optically connected to a light output surface of a scintillator and a corresponding photoelectric means. One would have been motivated to make such a modification for the purpose of providing mechanical adhesion and connectivity between scintillator elements and photoelectric means, while displaying high transparency and stability in the presence of X-ray radiation as suggested by Yoshida (see above, Fig. 6 and column 9, lines 55-60). Additionally, it would have been obvious

Art Unit: 2882

to one having ordinary skill in the art at the time the invention was made to modify the AAPA such that in at least one of the transparent means an area of a light output surface optically connected to the photoelectric means is smaller than an area of a light input surface upon which light from the scintillator is incident. One would have been motivated to make such a modification for the purpose of channeling of photons whereby the number of photoelectric means needed for event detection is reduced, as suggested by Muehllehner (column 5, lines 38-42).

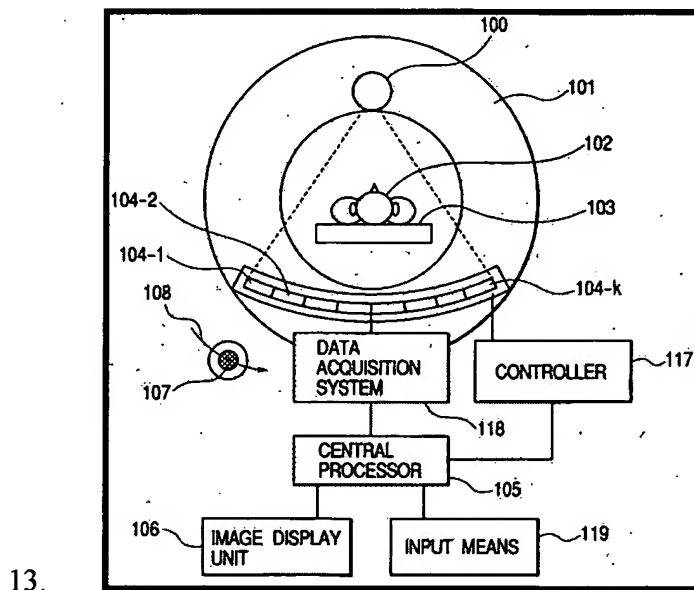


Figure 2 - X-ray CT Apparatus - AAPA - U.S. Patent Application 10/616,356; pp. 1-3 and 9

As per claims 5-8, AAPA as modified above, discloses an X-ray CT apparatus comprising an X-ray tube (100) a plurality of X-ray detectors (104) a data acquisition system (118), a detector control circuit (117), an arithmetic processing means (105) and an image display (106)- see Fig. 2 above and Specification pp. 1-3; 9; p. 39, lines 23-28.

Response to Arguments

14. Applicant's arguments filed 06.23.05 have been fully considered but they are not persuasive. In particular, Muehllehner (U.S. Patent 6,462,341) is introduced to meet the limitation of amended claim 1, wherein in at least one of the transparent means an area of a light output surface optically connected to the photoelectric means is smaller than an area of a light input surface upon which light from the scintillator is incident. As noted above, Muehllehner discloses a transparent means (90) wherein in at least one of the transparent means an area of a light output surface optically connected to photoelectric means is smaller than an area of a light input surface upon which light from the scintillator is incident. The transparent means (90) comprises linear and non-linear surfaces and has a shape in which an angle θ created between an input surface of the transparent means and an adjacent surface of the transparent means satisfies the relationship: $45 \text{ degrees} < \theta < 90 \text{ degrees}$ (see Fig.5 above). Muehllehner teaches that such construction enables the channeling of photons whereby the number of photoelectric means needed for event detection is reduced (column 5, lines 38-42).

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

Art Unit: 2882

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Courtney Thomas whose telephone number is (571) 272-2496. The examiner can normally be reached on M - F (9 am - 5 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272 2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Courtney Thomas
Examiner
Art Unit 2882

CT


EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER